ADVANCED MUSICSYSTEM II

by
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24K diskette

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LotsaBytes
15445 VENTURA BLVD., STE. 10
SHERMAN OAKS, CALIF. 91413

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1. Introduction

Advanced MusicSystem II is a program that allows you to make music with your Atari home computer. It is oriented toward those familiar with music notation and basic musical terms. With AMS II you enter musical notes from the computer keyboard. You have control over pitch, duration, envelope, dynamic level, meter, tempo, and key. A sophisticated music editor makes changes fast and easy. There are special commands to duplicate note patterns, and the tempo change command can be used to set a metronome marking as often as you like within a piece. The program allows up to 4 independent voices, each with a range of 5 1/2 octaves. You can produce and save very large music files (up to 8200+ notes with 48K RAM). Built-in recording synchronization lets you play at least 8 simultaneous voices using an external tape recorder. AMS II can handle very complex rhythms and extremely rapid tempos (more than 2100 notes per second).

The diskette version of AMS II requires a minimum of 24K RAM, and includes 7 demonstration pieces. The cassette version requires a minimum of 16K and includes one demonstration piece. A joystick can be used to adjust the tempo while a piece is playing. For maximum sound quality, it is strongly suggested that you connect your computer to an external speaker (see section 5.2).

2. Getting Started

To load the diskette version:

1. Remove all cartridges
2. Turn on disk drive
3. Place diskette in drive #1
4. Turn on computer

Advanced MusicSystem II will now load into memory and start automatically. If it loads correctly, you will see the main menu. To select an item from the menu, type the corresponding letter. Keyboard information is always input as either (1) single characters only (e.g., menu selections and certain prompts); or (2) one or more characters followed by RETURN (appears in a solid box and may be edited only with the DELETE key). SYSTEM RESET may be pressed at any time to return to the main menu, without destroying data already entered.

3. Using Advanced MusicSystem II

The following is a detailed explanation of the items appearing on the main menu.

3.1 PLAY

Use this option to listen to a piece entered or loaded into memory. Another menu will appear, allowing you to select which combination of voices to play. While the piece is playing, a piano keyboard appears on the screen, each voice represented by a different color. To stop a piece in the middle, press SYSTEM RESET.

You can use a joystick to vary the tempo while a piece is playing. Plug the joystick into the leftmost controller jack, and push it forward to speed up and pull it back to slow down. For programming tempo changes into a piece, see section 3.2.3.

3.2 ENTER/EDIT MUSIC

Select this option to enter music, or to edit previously entered music. If there is already music in memory, you will be asked for a voice number from 1 to 4. You'll then be placed in the measure after the last measure of the selected voice. The display for Enter/Edit Music shows

(1) the current voice and measure number
(2) the number of beats in the present measure
(3) the current meter and tempo
(4) the key signature in sharps and flats
(5) the current default values for octave number, duration, envelope, and dynamic
(6) the amount of memory left for entering notes
(7) a prompt at the bottom of the screen to remind you of the entry format (e.g., "Note[Oct][Dur][Env][/Dyn]?")

The center of the screen contains a movable cursor and is used to display notes. A variety of activities are available in Enter/Edit Music. These are

Entering notes
Editing notes
Change tempo
Go to measure
Insert measure
Change meter
Change key signature
Repeat notes
Play measure
Quit

These are described below in detail.

3.2.1 Entering notes

When you enter a note, you hear it and see it displayed on the screen. The cursor then moves to the next position. You can move the cursor by pressing the CTRL key with the up or down arrow key. When the cursor reaches the bottom of the screen, it is repositioned to begin a second column of notes. At the bottom of the second column, the cursor wraps around and "writes over" the first column. This is for display purposes only; the actual notes are still where you entered them, which you can see if you back up the cursor to the beginning of the measure. The format for entering notes is

```
Note[Oct][Dur][Env][/Dyn]
```

All items in brackets are optional. If you don't specify values for these items, the program uses the default values displayed on the right side of the screen. The format for a "rest" is R[Dur].

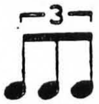
Note. Type the name of a note using the letters A to G, optionally followed by an accidental ('#'=sharp, 'F'=flat, 'N'=natural). You don't have to enter accidentals if they're in the key signature. If you use an accidental, it carries through until the end of the measure, or until you specify a new accidental for the same note. Double sharps and flats cannot be entered directly, but equivalent pitches can easily be used. For example, Dbb (double flat) can be entered as CN or B#.

Oct. Indicate the octave with a number between 1 and 6. Octaves begin with the note C and end with B, C4 being middle C. The lowest note is C1 (3 octaves below middle C, the lowest C on the piano), and the highest note is F6 (2 1/2 octaves above middle C). Through half-speed recording, the upper range can be extended to F7 (see section 3.10). If you don't specify the octave, the octave number of the note nearest the previous note is used. For example, a G following a C4 is interpreted as G3, not G4. Of course, you can always specify the octave number explicitly.

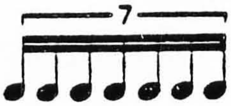
Dur. The basic duration is specified by:

W = whole note
H = half note
Q = quarter note
E = eighth note
S = sixteenth note
T = 32nd note
Z = 64th note

There are several ways to modify the basic duration. The simplest is either a dot (.) or double dot (..). The dot increases the length of a note by one-half, and the double dot increases the length by three-fourths. For example, a double-dotted quarter note, 'Q..', is as long as a quarter note plus an eighth note plus a sixteenth note. You can enter more complex rhythms by following the basic duration letter with any whole number up to 99. This is similar to the musical notation in which a figure is found above a bracketed series of notes, such as



or



In the first example, the duration of each of the eighth note triplets would be entered as 'E3'. In the second example, each of the sixteenth note septuplets has a duration of 'S7'.

(Note: Three triplets take the same amount of time as two regular notes. Five quintuplets or seven septuplets take the same amount of time as four regular notes. The general notational rule is: n-tuplets take the same amount of time as m regular notes, where m is the greatest power of 2 (i.e., 2,4,8,16 ...) less than or equal to n. Printed music does not always follow this rule consistently.)

The most general duration modification has the form "Dn:m", where D is one of the basic duration letters, and n and m are integers between 1 and 99. This has the meaning of "n notes in the time of m", or a note length of m/n times the basic duration letter. For example, a quarter note triplet, 'Q3', is equivalent to 'Q3:2'. A dotted half note, 'H.', is the same as 'H2:3' (i.e., 2 of these notes take the same time as 3 half notes). You could write a sixteenth note as 'E2:1', or 'Q4:1', or 'T1:2', etc. You will probably need to use this notation only rarely, for such situations as

(1) "uneven" durations (e.g., each note in a 3/4 measure containing 11 equal notes has a duration of 'Q11:3')
(2) extremely short notes (as short as 1/15 of a 64th note or Z15:1)
(3) extremely long notes

To make a note the length of an entire measure, specify the duration as the letter 'M'. This cannot be used if the meter is off (see section 3.2.6).

Env. AMS II provides 4 different envelope options. These are denoted by

(1) > (greater than sign) for normal notes
(2) ' (single quote mark) for shorter notes
(3) " (double quote marks) for shortest notes
(4)) (right parenthesis) for tied notes

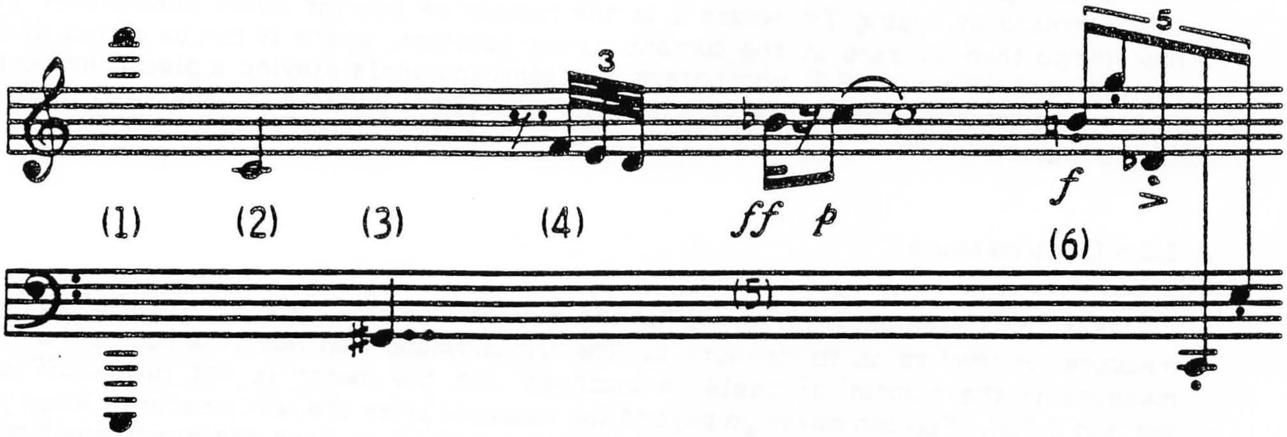
The normal envelope, option (1), smoothly decays the volume of a note toward the end. This avoids an unpleasant click which would otherwise result when the note is released. Options (2) and (3) shorten notes even further (by causing faster decays), an effect sometimes indicated in music by a dot or other articulation mark directly above or below a note. Option (4) prevents a note from decaying at all; use this envelope to tie notes together, or for a smooth legato effect between notes. The exact effect of these variable releases depends on both the length of the note and the tempo. Experiment to obtain the desired results.

/Dyn. There are 15 dynamic levels available for each note. These are, from softest to loudest,

/PPP /PP /P /MP /MF /F /FF /FFF /F1 /F2 /F3 /F4 /F5 /F6 /F7

You should generally use the lower 8 dynamics. Use /F1 through /F7 for various levels of accents. All 4 voices at /FFF or higher may cause distortion.

Remember, the only input absolutely required to enter a note is its name. If you omit the octave, duration, envelope, or dynamic the most recently entered values will be retained. The following figure illustrates the keystrokes necessary to enter the notes shown. Assume that the RETURN key is pressed at the end of each line.



(1) lowest and highest notes: C1 and F6
(2) C4H (middle C)
(3) G#2Q..
(4) RE.
   F4T3
   E
   D
(5) BF4S/FF
   R
   CE)/P
   CW>
(6) BN4ES'/F (or BN4ES"/F)
   G5
   DF4/F3 (or /FFF or /F6 etc.)
   C2/F
   E3

3.2.2 Editing notes

A measure can hold up to 127 notes. The display screen represents a "window" on the measure, 34 notes wide. Move the cursor within the measure by pressing CTRL with the up or down arrow key. AMS II provides several methods for editing already entered notes.

(1) Insert a note by positioning the cursor and entering a new note. All notes starting at the cursor will move down one position and the new note appears where the cursor was.

(2) Delete a note by positioning the cursor and pressing the CTRL and DELETE keys. The note disappears and all notes following the cursor move up one position.

(3) Delete all the notes in a measure by pressing the CTRL and CLEAR keys. The program erases the notes and repositions the cursor at the beginning of the measure. If you leave an empty measure, all succeeding measures move down by one, thus deleting that measure.

3.2.3 Change tempo

You can control the tempo of a piece with complete flexibility by using the change tempo command. It can be used any number of times in a piece, in any voice. Invoke this command by typing Tx, where x is the number of quarter notes per minute. The new tempo then appears at the current cursor position, where it can be edited like a regular note. When AMS II encounters this command while playing a piece, the tempo is reset to the specified value; this happens even if the joystick is being used to alter the tempo.

3.2.4 Go to measure

When you finish entering notes for the current measure, type 'M' to go to the next measure, or 'Mx' to go to measure x. The 'M' command will not take you to the next measure if the number of beats is incorrect and the meter is not turned off (see section 3.2.6). You can never go beyond the measure after the last measure. When you go to a previously entered measure, the notes are displayed and the cursor positioned at the end of the measure. Since the program does not store the actual keystrokes used to enter notes, the notes must be decoded directly from memory. Thus, they may not be displayed the way you entered them. For example, the octave, duration, and dynamic appear whether or not you entered them. A 'b' represents a flat instead of 'F'. The dynamic appears in lower case and the normal envelope ('>') is not displayed. Sometimes, depending on the key signature, a note is interpreted as its enharmonic equivalent (e.g., G# for Ab). Occasionally there are discrepancies in decoding complex durations:

(1) The simplest possible interpretation is taken. For example, 'S3' is displayed if you entered 'S6', or 'Q..' instead of 'Q4:7'.

(2) Notes longer than 'W..' are decoded as 'W+'.

(3) Durations that can't be reduced to a power of 2 ratio of 15:8 or lower are displayed as the next higher basic duration letter followed by '?'. For example, 'Q7:5' is decoded as 'Q?' and 'Q5:7' is decoded as 'H?'.

These situations are not normally encountered and should present no difficulties. Remember, only the display of a note may be different; the note itself is still in memory exactly as you defined it. Also, the exact number of beats for a note is always displayed correctly.

3.2.5 Insert measure

Type the command 'I' to insert a measure just before the current measure. All the measures beginning with the current measure move over one to make room for the new measure, leaving an empty measure displayed. This command has no effect if the present measure is empty.

3.2.6 Change meter

Type the command 'MET' to change the meter. In response to the prompt "Meter(x/y):", either (1) enter 2 numbers separated by '/'; (2) type '0' (zero) to turn off the meter; or (3) press RETURN if you change your mind. The first number indicates the number of beats in a measure, and must be an integer between 1 and 32. The second number indicates which note gets a beat, and must either 1, 2, 4, 8, 16, or 32. If the meter is not turned off, it aids in ensuring that the correct number of beats appears in the measure. If you attempt to enter a note that causes the number of beats to be too large, or you attempt to go to the next measure when there are too few beats, the command is ignored and you get an error message. The meter is an input aid only and has no effect on playback.

Measure synchronization is automatically performed if the meter is not turned off. Complex enough rhythms produce durations that cannot be expressed exactly by AMS II. What happens is that when you enter enough notes to fill the measure, the number of beats appears to be a fraction too low. When you exit the measure, the program will apply a small fractional correction to certain notes to precisely synchronize the measure. To illustrate, set the meter to 4/4 and enter 7 different notes with the duration 'Q7'. Notice that the number of beats is 3.99 instead of 4. Now reenter the measure with the 'Mx' command, x being the current measure number. The total number of beats in the measure is now exactly 4. The first note is only 0.7% longer than the others, undetectable during playback.

3.2.7 Change key signature

Type the command 'K' to change the key signature. In response to the prompt "KEY(x# or xF)", type a number from 0 to 7 followed by '#' or 'F'. For example, a key signature of '3#' means that you don't have to type the '#' when entering F#, C#, or G# (automatic sharps in this key). Sharps and flats may always be specified explicitly. The key signature only effects the way you enter notes, not playback. Changing the key signature after notes have been entered may cause them to be displayed differently, but does not change the notes in memory.

3.2.8 Repeat notes

Several commands save you the trouble of entering a sequence of notes more than once. These commands take the following forms:

REPx REPx,y REPM REPMx REPMx,y

The first two commands are used to duplicate single patterns of notes, while the other commands are used to duplicate whole measures. REPx means "repeat the last x notes", and REPx,y means "repeat the last x notes y times". These two commands insert up to 127 notes at the cursor position, including notes from previous measures. REPM means "repeat the current measure" or, if the current measure is empty, "repeat the previous measure"; REPMx means "repeat measure x" and REPMx,y means "repeat measure x through measure y". These three commands insert the repeated measures after the current measure, or in the current measure if it is empty. Succeeding measures are automatically renumbered.

3.2.9 Play current measure

You can play the current measure at any time by typing the command 'P'. Note that the last defined tempo will be in effect, as shown on the right side of the screen.

3.2.10 Quit

Type the command 'Q' for a normal exit from Enter/Edit Music to the main menu.

A quick reference guide to all commands in Enter/Edit Music is located at the end of this manual. You may find it useful while using AMS II.

3.3 ERASE

Select this item from the main menu when you want to enter a new piece and there is already music in memory. When the prompt appears, press 'Y' to erase all voices, or any other key if you change your mind. It is not necessary to use ERASE before loading a piece from disk or cassette.

3.4 PLAY MEASURE(S)

This selection is useful for listening to sections of a piece and finding errors. In response to the prompt, type either a single number to play that measure, or two numbers separated by a comma to play a series of measures. The voices you then select will play.

3.5 SAVE

Use this selection to save the music in memory onto a disk or cassette.

Diskette version. Type your file name according to standard DOS II rules (don't include 'D:'). The piece is then saved on the diskette in drive #1. You must use diskettes formatted using DOS II (see section 3.9).

Cassette version. When you hear two beeps, simultaneously press PLAY and RECORD on the program recorder, then press the RETURN key. The recorder will stop when the piece is saved.

3.6 LOAD

Use this selection to load a music file into memory from diskette or cassette. Any music previously in memory is automatically erased.

Diskette version. Type the name of the file you wish to load (DOS II wildcards are permissible). The file is loaded from drive #1.

Cassette version. When you hear a beep, press PLAY on the program recorder, then press the RETURN key. The recorder will stop when the piece is loaded.

3.7 DISK DIRECTORY

Use this selection to display a directory of all the files on the diskette in drive #1 (diskette version only). The screen displays the amount of free space on the diskette followed by the prompt 'LOCK, UNLOCK, or DELETE files?'. Press 'L', 'U', or 'D' to select one of these functions, followed by a filename (wildcards are OK). The directory reappears after the function is executed. Press RETURN for the main menu.

3.8 TEMPO

The tempo determines the speed a piece is played. You can change the tempo before, during, or after a piece is entered. Changing tempo is also possible after you've saved a piece or while it's playing. The "TEMPO" selection from the main menu operates the same as the change tempo command, but is only in effect at the beginning of a piece. You specify the tempo by entering a number equal to the number of quarter note beats per minute. This number is usually the metronome marking for a quarter note. If the quarter note is not the basic unit of measurement, you must convert the tempo. For example, in a 6/8 piece with a metronome marking of ♩.=80, convert it to the mathematical (though not musical) equivalent of ♩=120. The tempo displayed in the main menu may be slightly different from the number you enter, particularly for fast tempos. The displayed number is closest to the exact tempo as it will be played. The displayed tempo will change to reflect the most recent tempo, whether changed directly, by a change tempo command, or by joystick.

To use a joystick to change tempo while a piece is playing, make sure it is plugged into the leftmost controller jack. Then push the joystick forward to speed up and pull it back to slow down. This is useful for setting a basic tempo, since you can hear the effect as you alter it. Remember, if a tempo change command is encountered the tempo will always be reset to the value specified.

3.9 FORMAT DISK

You must use DOS II formatted diskettes for storing music files (diskette version only). Use this selection to format a diskette in drive #1. Formatting a diskette wipes it clean, so be sure there is nothing on it you wish to save. After the prompt appears, press any key but 'Y' if you change your mind.

3.10 RECORD w/TIMING MARKS and RECORD

You can play more than 4 voices simultaneously using these two recording functions and an external tape recorder (not the program recorder). This feature allows you to record the first set of voices preceded by timing marks. These appear as 5 equidistant blips followed by a period of silence. You then time successive sets of voices by using the blips. In this way, 8 or more voices can play in perfect synchronization.

You can record several sets of voices if you have a 4-channel tape deck with the capability of monitoring at the record head. This is known as "multi-sync" or "simul-sync". You can record even more than 16 voices by periodically mixing down two or three tracks into one.

If your tape deck has sound-on-sound capability, you can do limited recording of 8 or more voices. If you don't have sound-on-sound, one set of voices plays back through your tape recorder or stereo system while the computer plays another set through the television speaker.

You'll obtain the best results by connecting the computer directly to your stereo or to the "line" input of your tape deck (see section 5.2). It's also possible to use a separate microphone or portable cassette recorder to record the sound coming directly from the television speaker.

To record the first set of voices, or track, load the music into memory, select "RECORD w/TIMING MARKS" from the main menu, and select the appropriate voices. Put your tape recorder into the RECORD mode and turn it on. Press the START button on the computer and you'll hear 5 quick beeps and several seconds of silence before the music begins. When the piece is over, rewind the recorder to the original starting position.

Now load the second set of voices into memory. Select "RECORD" from the main menu and indicate which voices are to be played. If you don't have a multi-track or sound-on-sound tape deck you won't record the second set of voices, but only play them back. Turn on the tape recorder to play back the first set of voices and, if appropriate, to record the second set. Press the START button on the computer at the exact moment you hear the 5th timing mark. The computer will emit a single beep. If it's not exactly simultaneous with the recorded timing mark, press SYSTEM RESET, rewind the tape, and try again. If successful, both sets of voices sound in sync. Repeat this process to record additional sets of voices.

If your tape recorder has 2 speeds, you have the option of recording at half-speed. This allows you to shift the effective range of AMS II one octave higher. Set your recorder at the slower of the two speeds. When the REC. W/TIMING MARKS or RECORD display appears, press '2' before turning the recorder on. Timing marks and silence will now be twice as long as before. When you play this track at the faster speed it will be synchronized with other voices played normally. You can record sets of voices in any mixture of half and normal speeds. Note that voices recorded at half-speed play back an octave higher and twice as fast. You must therefore enter these voices with durations twice as long as normal, and pitches an octave lower than notated.

***** Special Offer *****

As a demonstration of these recording techniques, a high quality stereo cassette recording is being offered. The recording exhibits the potential power of AMS II. It contains the entire first movement of Rachmaninoff's Piano Concerto #2 in c minor, recorded in 16 voices and consisting of more than 16,000 notes. To obtain a copy, send your name and address and $3.50 in check or money order to

Lee Actor
1529 Koch Lane
San Jose, CA 95125

4. Sample Session

This session takes you through entering, playing, and saving a short excerpt from Haydn's Op. 74 #1 string quartet. As you enter the notes, follow the score reproduced on the next page to see how printed music is translated into typed commands.

Boot up AMS II and press 'B' to select Enter/Edit Music. You will automatically be placed in measure 1 of voice 1. Start entering the music for the first violin part, as shown below. If you make a mistake, use the editing keys. The commands for each measure appear on a single line, followed by comments in parentheses. A blank space separates individual commands from one another. Complete each command by pressing the RETURN key.

```
T90 B4M/FF M (a slower tempo for the first 2 measures, and greater dynamic contrast)
CQ RH. T140 M (back to the "real" tempo)
CH)/PP D M
B CQ> C#/P M
DH EFQ/MP EN M
G/MF GT/F F REP2,2 E F EQ RE G'/FF M
C ES D" C B A G F E D C B A G F M
EH) DQ> A4/FFF M
C4H/FF BE' C" D E M
GQ> GT F REP2,2 E F EE RQ. M (short last note to match cello)
REPM3 M
B CQ> E/P M
FH/MP F#Q/MF G/F M
AE./FF BT3 A G# AE. BS CQ." CE M
CS) E5" F F# G) B4" C D E) E4" FN F# G) B3" C D M
EH> FQ A/FFF M
C4T/FF D E D REP2,13 C D M
CE Q
```

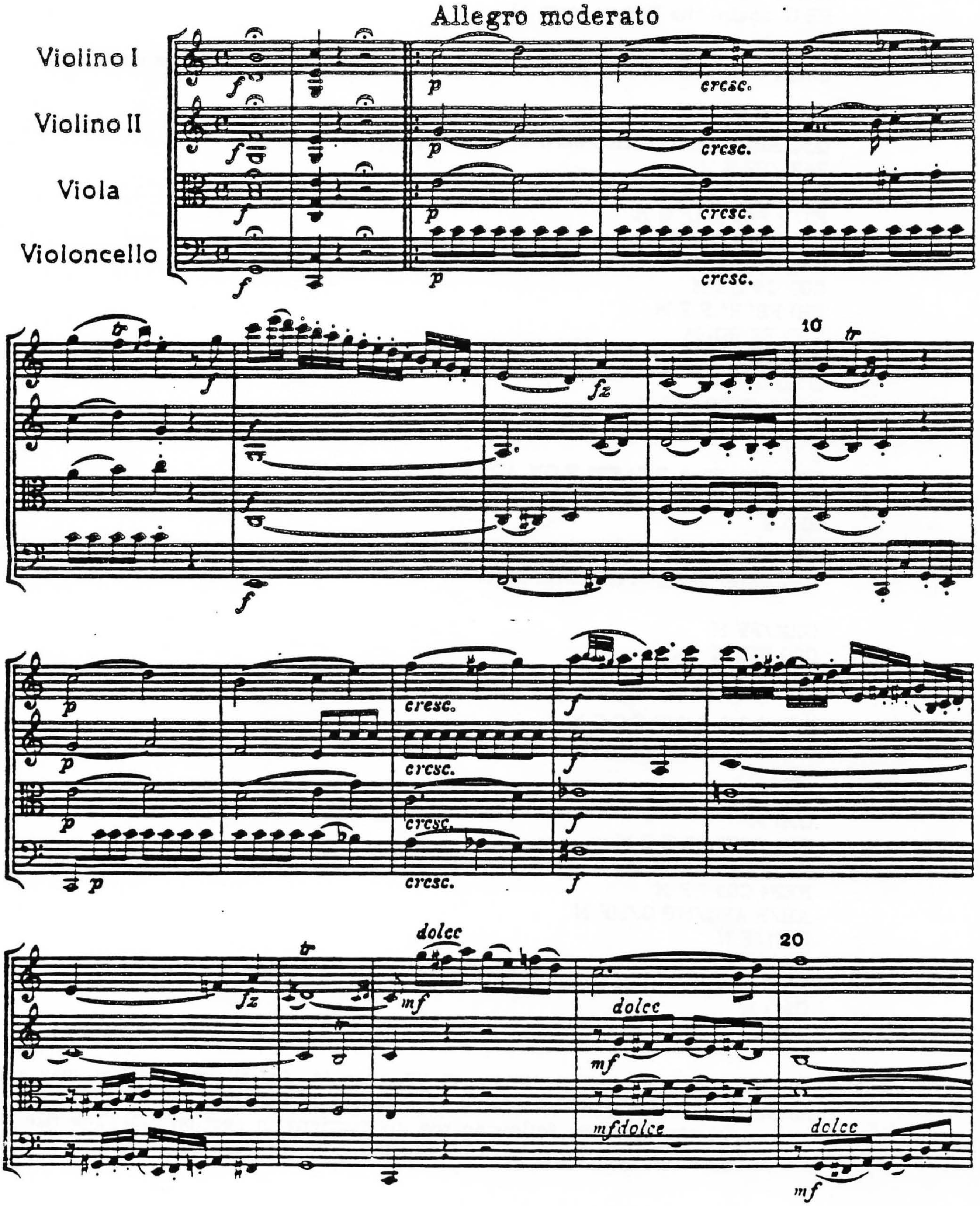
To check what you've entered so far, play voice 1 (press 'A' then 'L'). If there's an error, reselect voice 1, go to the appropriate measure, and fix it.

You're now ready to enter the music for the second violin part. Press 'B' for Enter/Edit Music, select voice 2, and enter the notes as follows.

```
F4M/FF M
EQ RH. M
GH)/PP A M
F G M
AQ..>/P BS CQ'/MP C M
C)/MF D> G4/F R M
G3M M
AH. CE D M
DH) DE' R B" C M (the first C is already in voice 1)
CQ> B CE RQ. M
REPM3 M
F EE" C5 C C M
C/P C C C C/MP C C/MF C M
```

Op. 74, No. 1, in C Major

I



```
CH/F A3 M
CM) M
C M
CH> CT/FF B REP2,7 M
RE Q (again, the C is in voice 1)
```

Check the second voice and proceed as before to enter voice 3, the viola part:

```
D4M/FF M
G3Q RH. M (see section 5.1.1 on reducing chords)
E4H)/PP F M
D E M
F>/P F#Q'/MP G M
A)/MF B> C/F R M
C3M) M
CQ> C# DH M
FH) FE' E" F E M
DH> EE RQ. M
REPM3 M
D EQ G M
C4H.>/P DQ/MF M
EFM/F M
E M
RS G#3"/FF A B C) E3" F GN AQ' A M
GH F M
EE> Q
```

Now enter voice 4, the cello part:

```
G2M/FF M
C2Q RH. M
C4E"/PP REP1,7 REPM
M
C/P C C C C/MP C C C M
C/MF C C C CQ>/F R M
E2M M
FH. F#Q M
GM) M
GH> C2E" C3 G E M
C/PP C4 REP1,6 M
REP4 CQ> BF M
AH/P AFQ/MP G/MF M
F#M/F M
G M
RS G#2"/FF A B C) E2" F GN AQ' F# M
GM> M
C2E Q
```

To play the piece, press 'A' for PLAY, then 'A' for all voices. You may want to experiment with different tempos (see beginning of voice 1). When you're satisfied, you can save the piece by following the instructions in section 3.5. The file can be loaded later for playing, editing, or completing.

5. Helpful Hints

5.1 Planning a piece of music

5.1.1 General considerations

(1) Number your measures (every 5th measure is adequate). This serves as a check that you haven't omitted any measures and is invaluable when editing later.

(2) Divide the music into sections of 10 to 30 measures. Enter all the voices for each section before going on to the next. This lets you check on the total result as you go along and make adjustments to dynamics and tempos early.

(3) Most piano music and many orchestral pieces can be reduced to 4 or fewer independent voices. When more than 4 pitches occur at once, you must decide which ones to eliminate. Generally, you should keep the lowest and highest pitches. Eliminate pitches that are duplicated in different octaves. Then keep the next 2 most important pitches. There is no general rule for picking "important pitches" in all types of music; it depends on harmony, voice leading, and other factors. You should usually place the pitches so that you have larger intervals at the bottom and smaller intervals at the top.

(4) If a piece consistently has more than 4 independent voices, you may want to consider special recording techniques (see section 3.10).

5.1.2 Entering notes

(1) Plan dynamics by scanning the whole piece, deciding which are the softest and loudest parts, and setting their dynamic levels. The other dynamics should be fit into this scheme. It's not necessary or desirable to follow printed dynamics literally. Sometimes you will need to bring out a part or push a secondary part into the background. On a crescendo or diminuendo it's best not to build it up too soon; save more of the dynamic changes for the end. A smoother effect will be created if the dynamic changes occur at slightly different times in different voices.

(2) Immediately test the first passage in which you try a new kind of articulation.

(3) When one or more short notes follow two or more slurred notes, the last slurred note should also be shortened to prevent the first short note from sounding legato.

(4) If the same note in the same octave appears in 2 voices simultaneously, enter the note in one of the voices and a rest in the other. Due to the way in which the computer generates sounds, the note in one voice may be out of phase with the same note in the other voice, causing considerable decrease in the apparent volume.

5.1.3 Saving memory

(1) Always use dotted and double-dotted durations where possible. This replaces 2-3 tied notes or 2-3 rests with a single note or rest.

(2) Use the duration 'M' for a note or rest filling a whole measure.

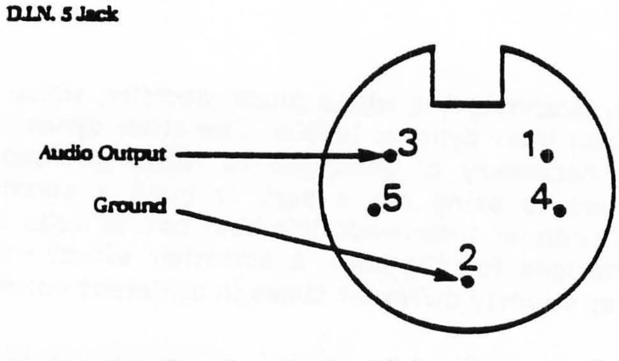
(3) Express tied notes by using 'Dn:m' notation. For example, a half note tied to a eighth note is the same as a single note written as 'H4:5'.

(4) If you're really desperate, enter notes or rests lasting more than one measure in one command. For example, 12 measures rest in 3/4 can be written as RW1:9 (36 beats rest). However, the measures won't line up with the other voices, and you won't be able to use "PLAY MEASURE(S)" from the main menu.

5.2 Connecting the computer to your stereo system

If your computer has a monitor jack, you can construct a simple cable to directly connect the computer's sound output to a stereo system. It is highly recommended that you make this connection in order to hear the total capabilities of AMS II, particularly in terms of clarity and low register reproduction (C1 is approximately 32 Hz). Even a small inexpensive amplifier and a single small speaker will be a noticeable improvement over the television speaker. If you are using a monitor instead of a television, you should already have a separate audio output from the monitor jack. Otherwise, construct a cable as follows:

(1) The figure below shows the view looking directly into the monitor jack.



Pin #3 carries the audio signal and pin #2 is the ground. The other pins carry video information and will not be used.

(2) You will need (a) a 5-pin male DIN connector; (b) a length of standard shielded cable; (3) an RCA-type phono plug to connect to a high-level input on your amplifier (AUX, SPARE, TAPE, or TUNER); and a few tools. Buy the appropriate "Y-adapter" if you want to connect to both left and right channels.

(3) Decide on the length of cable you need and strip about 1 inch of insulation from each end. Don't cut through the braided shield. Pull the shield to one side on both

ends.

(4) Strip 1/2 inch of insulation from the middle conductor on each end.

(5) On one end, twist the shield together and solder to ground pin #2 on the DIN plug connector. Solder the middle wire to pin #3 on the DIN plug. (Since it has to fit into the jack as shown above, #3 on the DIN plug is on the upper right as you look into it from the end.)

(6) On the other end, twist the shield together and solder to the "outside", or ground of the phono plug. Solder the middle wire to the middle pin on the phono plug.

(7) Wrap each solder connection in insulated tape and crimp the strain relief (if any) securely around each end.

Set the volume low when you first try the sound through the stereo, as the input level is quite high. You may want to turn down the treble control to filter out the edginess of the computer sound.

6. Musical Demonstrations

ADVANCED MUSICSYSTEM II includes 7 demonstration pieces with the diskette version, and one demonstration piece with the cassette version. These will give you an idea of what you can do with the program. To hear one of the demos, load it into computer memory using the instructions in section 3.6. Then press 'A' twice. The minimum required RAM is given in parentheses after the name of each piece. All of the pieces are included on the diskette version; only the last piece listed is included on the cassette version.

BEE (24K)

This piece is "Flight of the Bumblebee", by Rimsky-Korsakov. Try playing it at different tempos to see the speed capability of AMS II. Even at the maximum tempo, the piece is going only 1/60th as fast as possible.

FANTIMP (32K)

This is a fairly complex demo piece. It is "Fantasy-Impromptu in c# minor, Op. 66" by Chopin. Note the cross-rhythms of 4 against 5 against 3, and 7 against 6, easily handled by AMS II.

NUT (32K)

This is the "Overture to The Nutcracker", by Tchaikovsky. Notice the different envelopes used for articulation.

WTCI5 (24K)

This file name stands for J.S. Bach's "Well-Tempered Clavier, Book I #5 in D". It consists of a prelude followed by a fugue. You will hear the fugue performed in the French style with overdotting, notes inegales, and suitable baroque ornaments.

NUNKOMM (24K)

This demo is an organ chorale by J.S. Bach, "Nun komm' der Heiden Heiland". It shows you how much the computer sounds like an organ; on a stereo system the lowest notes sound like real organ pedals. At times the piece calls for 5 or 6 independent voices, reduced here to 4.

TFUGDM (40K)

This is the famous "Toccata and Fugue in d minor" by J.S. Bach. The free, improvisational nature of this piece requires many gradated tempo changes, and a variety of envelopes.

TOCCATA (24K diskette; 16K cassette)

This is the Toccata from the "Toccata and Fugue in d minor" (see above).

7. Error Messages

7.1 Music input errors

In Enter/Edit Music, a "window" near the top of the screen displays error messages. The various messages are described below with suggested actions.

(1) Invalid command
This is a common message, indicating improper syntax, note out of range, or nonexistent command. The command is displayed in the error window, so you can examine where you went wrong and change your entry.

(2) Measure full
You have attempted to enter more than 127 notes in a measure.

(3) Mem
If you try to exceed memory capacity, a bell rings and the word "Mem" is highlighted. The number of remaining possible notes is always displayed on the right side of the screen after "Mem=".

(4) Meter

Too few or too many beats in a measure rings the bell and highlights the word "Meter". Either enter the correct number of beats or turn the meter off.

7.2 I/O errors

(1) If you try to load a file that exceeds the available memory capacity the message "Not enough RAM" appears.

(2) Any of the standard DOS and operating system I/O errors (File not found, Disk full, etc.) may appear as a result of the following commands:

SAVE file
LOAD file
DISK DIRECTORY
LOCK file
UNLOCK file
DELETE file
FORMAT DISK

8. Comparison of Advanced MusicSystem II with Advanced MusicSystem

Advanced MusicSystem II is a complete revision of the original Advanced MusicSystem. It is written totally in machine language and uses an upward compatible data format, so that it can load and play music files created with the original program. However, music files produced with AMS II will not play correctly with the old program.

AMS II offers many improvements and differences when compared with the original AMS. Some of the most significant are:

(1) Much larger music file capacity (8200+ notes vs. 3400+ notes for 48K disk)
(2) Variable envelope releases (no more clicks!)
(3) Tempo change command
(4) SYSTEM RESET is functionally non-destructive
(5) Faster editing
(6) Much faster note decoding
(7) 64th note duration allowed directly
(8) Data files are smaller
(9) REP commands can be used in the middle of a measure, and can access previous measures
(10) Ties are stored with the note (as are the other envelopes)
(11) Voices may end independently
(12) Custom DOS
(13) When editing, notes are always inserted at cursor position, rather than overwriting old notes
(14) Maximum of 127 notes per measure, rather than 255

Old music files, if left unaltered, will sound slightly different using AMS II. This is because all notes produced by the original program will have standard envelopes applied to them by AMS II, including tied notes. If the effect is too bizarre, you can always edit the piece by restoring ties, assigning envelopes and/or removing rests, and then resaving it.

Command Summary for Advanced MusicSystem II

- Note[Oct][Dur][Env][/Dyn]
  - Note: N or Na or R (N=A,B,C,D,E,F,G a=#,F,N)
  - Oct: 1-6
  - Dur: D or D. or D.. or Dn or Dn:m or M (D=W,H,Q,E,S,T,Z n,m=1-99)
  - Env: >,',",)
  - /Dyn: /d (d=PPP,PP,P,MP,MF,F,FF,FFF,F1,F2,F3,F4,F5,F6,F7)
- Tx: change tempo to x

- CTRL up arrow: move cursor up
- CTRL down arrow: move cursor down
- CTRL DELETE: delete note
- CTRL CLEAR: clear measure

- M: go to next measure
- Mx: go to measure x

- I: insert measure

- MET: change meter
  - x/y: new meter (x=1-32, y=1,2,4,8,16,32 x=0 turns meter off)

- K: change key signature
  - x# or xF (x=0-7)

- REPx: repeat last x notes
- REPx,y: repeat last x notes y times
- REPM: repeat most recent measure
- REPMx: repeat measure x
- REPMx,y: repeat measures x through y

- P: play current measure

- Q: quit, return to main menu

rod-XYZZY